REMARKS

Applicants have amended the claims to more particularly define the invention taking into consideration the outstanding Official Action. Applicants submit that the amendments to the claims are fully supported by the specification as originally filed and no new matter is introduced. Moreover, the amendments are minor in nature and make the corrections requested by the Examiner and therefore do not raise any new issue. Entry of the amendment is in order and most respectfully requested.

The objection to claims 1 and 12 because of the following informalities: improper grammar has been obviated in view of the amendments to the claim. Applicants have amended claims 1 and 12 to correct the improper grammar as requested by the Examiner. Accordingly, it is most respectfully requested that this objection be withdrawn.

Applicants most respectfully submit that all of the claims now present in the application are in full compliance with 35 USC 112 and clearly patentable over the references of record.

The rejection of claims 1, 6, 11, 12, 17, and 22 under 35 USC 103(a) as being unpatentable over Yang in view of Holloway and Novotny et al. has been carefully considered but is most respectfully traversed in view of the following comments.

The Examiner recognizes that the Yang reference does not teach the two limitations in the claims 1 and 12 of present invention, which are that (a) the liquid organic-based solution is selected from the group consisting of siloxane and silsesquioxane and (b) the isolation of Si-OH groups from the environment restrains the occurrence of electro-osmotic flow, but the limitations can be taught from the citations Holloway and Novotny. Therefore, it is urged in the Official Action that claims 1 and 12 of present invention are lack of non-obviousness. However, Applicants do not agree for the following reasons as would be appreciated by one of ordinary skill in the art to which the invention pertains:

(1) The objects of the inventions are different and not suggested by the prior art:

First of all, the major object of Yang is to provide surface coatings for microfluidic devices to obtain **stable and reproducible electro-osmotic flow** (see the column 2, lines 14-19 of Yang). However, the object of the present invention is a method of modification for the surface of glass substrates, which can **suppress occurrence of electroosmotic flow effect** (see page 1, lines 7-9 of the specification of the present application). Accordingly, the objects of the invention are totally different from the present invention and Yang. The Examiner indicated that although the limitation of "the isolation of Si-OH groups from the environment restrains the occurrence of electro-osmotic flow" is not disclosed in Yang, this limitation can be taught by citation Novotny. However, one skilled in the art cannot have any motivation to combine Yang and Novotny because the major objections of them are totally difference. Yang is related to a method to produce **stable and reproducible electro-osmotic flow,** while citation Novotny is related to **a method to reduce/restrain/eliminate electro-osmotic flow.** Regarding the combination of Yang and Holloway, there is the same reason as above. In addition, although the objects of Holloway and Novotny are also for reduce electro-osmotic flow, the method they used are the same as what the applicant mentioned on the background of the specification (page 3 line 21 to page 5 line 1-15). Accordingly, the method of Holloway and Novotny are different from the present invention.

(2) The processes of how to restrain electro-osmotic flow are different:

The methods of present invention are different from and unobvious from all citations and have non-obviousness as shown in the Table 1 below, especially the numbers of processing steps to restrain electro-osmotic flow. The method of modifying surface in Yang is reacting APS(3-aminopropyltriethoxysilane) with the functional group on the glass to afford an aminopropyl silylated surface, followed by treating with couple aspartic acid to give an ASP-derivatized surface. Finally, the ASP-derivatized surface reacts with activated heterofunctional PEG to gain the glass of modifying surface, i.e. the final modifying surface (see the figure 13). It demonstrates that the method of Yang needs **three processing steps to form three layers on the substrate surface**. Most important is that the surface modified method of Yang is for obtaining **stable and**

reproducible electro-osmotic flow not to reduce the electro-osmotic flow. Regarding the method for modifying surface in Holloway, it performs surface derivatization of free silica groups in silica capillaries by first reacting the silica surface with polyorganosiloxanes in a process in which the polyorganosiloxanes further react with vinyl groups in order to provide links to bind the gel matrix (see column 3, lines 62-67, and column 4, lines 1-14), which is implicating that the process of modifying surface is **three steps** and to form **two layers** on the substrate surface in Holloway. In the citation Novotny, the method of modification is to convert the silanol groups on the surface to silicon halide groups, then react these groups with an organometallic reagent having a terminal ethenyl moiety and finally react these ethenyl groups with a neutral organic monomer in an addition polymerization reaction to form a polymer layer over the surface (see abstract of the citation Novotny). As such, it implicates that the processing step of modification is **three steps** and to form **two layers** on the substrate surface in the citation Novotny. To summarize above, the modification methods of three citations are all demand for three processing steps and need to form more than one layer to achieve their purposes. However, the processing step of present invention is **only one step and to form only one layer on the substrate surface**, which is to apply heat treatment to the substrates coated with the organic-based solution to cross-link and solidify the liquid organic materials (see the claim 1 of present invention). Therefore, the modification method of present invention needs shorter processing time and has higher yield than all citations. As such, the method for modifying surface in the present invention can greatly reduce fabrication cost and increase the production performance.

Moreover, regarding the thermal resistance, the figure 13 of Yang shows that the functional groups of the outer coating of glass surface is -C-NH_2 or -C-OH, and the functional group of outer coatings in the citations Holloway and Novotny are both -C-$CONH_2$ (see the figure 6 of Holloway and the column 6, lines 30-44 of citation Novotny). One skilled in the art knows that those functional groups have weak thermal stability. Moreover, in view of another aspect, since all citations have more than one coating layer on the substrate surface, it needs many C-C bonds to link the outer coating layer to the substrate surface. One skilled in the art knows that the C-C bond is easy to

decompose at high temperature, as such the more C-C bonds, the worse thermal stability. Contrary to the citations, the coating of substrates surface for modifying in the present invention composes of Si-O bonds, which is similar to the chemical structure of glass, and the coating in the present invention is applied to heat at 425°C to form it. Hence, the thermal resistance and stability of present invention is much better than all citations. In addition, regarding the long-term stability test, the present invention is much better than citation Novotny. Accordingly, the present invention is not obviousness over the cited prior arts.

Table 1

	The present invention	Yang	Holloway	Novotny
The object of surface modification	To reduce electro-osmotic flow	To **obtain** electro-osmotic flow	To reduce electro-osmotic flow	To reduce electro-osmotic flow
The number of processing step	1	3	3	3
The number of coating layer	1	3 (see figure 13)	2 (see figure 2)	2
Yield	High	Low	Low	Low
Processing time	Short	Long	Long	Long
Thermal resistance	Excellent (see claim 5)	Poor	Poor	Poor
Long-term stability test	Over 45 days (see Example 3, figures 5 and 6)	N/A	N/A	Two weeks (see column 12, lines 28-30)

To sum up above, the method of present invention is a patentable one. One skilled in the art cannot combine these references to teach the present invention. Accordingly, it is most respectfully requested that this rejection be withdrawn.

The rejection of claims 2, 4, 9, 10, 13, 15, 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over Yang in view of Holloway and Novotny, and further in view of Livesay et al. has been carefully considered but is most respectfully traversed in view of the amendments to the claims and the above comments. Accordingly, it is most respectfully requested that this rejection be withdrawn.

The rejection of claims 5, 7, 8, 16, 18, and 19 under 35 U.S.C. 103(a) as being unpatentable over Yang in view of Holloway, Novotny, and Livesay, and further view of Chen et al. has been carefully considered but is most respectfully traversed in view of

the amendments to the claims and the above comments. Accordingly, it is most respectfully requested that this rejection be withdrawn.

In view of the above comments and further amendments to the claims, favorable reconsideration and allowance of all the claims now present in the application are most respectfully requested.

Respectfully submitted,
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